REMARKS/ARGUMENTS

The Pending Claims

Claims 1-50 and 96-163 are pending and are directed to a continuous method for preparing acoustical panels having a Normal Incident Sound Absorption of at least about 0.32. Reconsideration of the pending claims is respectfully requested.

Applicants' Summary of the Examiner Interview

Applicants thank Examiner Phillips for the courtesies extended to Applicants' representatives, Caryn Borg-Breen and Salim A. Hasan, during the telephonic interview of August 24, 2007. The obviousness rejections were discussed consistent with the remarks set forth herein.

The Amendments to the Claims

Claim 24 has been amended with respect to form regarding the recited open cell. New claims 123-163 have been added. New independent claim 123 combines the features of claims 1, 2, and 24 and further recites that the acoustical panel has a density of from about 10 lb/ft^3 to about 25 lb/ft^3, as supported by the instant specification at, for example, paragraphs [0030], an open cell structure sufficient to give rise to the Normal Incident Sound Absorption as supported by the instant specification at, for example, paragraphs [0061], and that the foaming agent is added to the aqueous calcined gypsum mixture in the form of pregenerated foam, as supported by the instant specification at, for example, paragraph [0071]. New independent claim 138 combines the features of claims 1, 2, 4, and 6. New independent claim 151 combines the features of claims 1, 2, 4, and 24, and further recites that the acoustical panel has a density of from about 10 lb/ft^3 to about 25 lb/ft^3, as supported by the instant specification at paragraph [0030] and an open cell structure sufficient to give rise to the Normal Incident Sound Absorption as supported by the instant specification at, for example, paragraphs [0061]. Dependent claims 124-137, 139-150, and 152-163 are taken from various combinations of dependent claims 2-44. No new matter has been added by way of these amendments.

Summary of the Office Action

Claims 1, 11-12, 14, 18-20, 27-29, 33-34, 38-40, 96, and 106 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon and Saito. Claims 2-6, 8-10, 15-17, 97-101, 103-105, 107-109, and 111-112 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and Baig. Claims 7, 102 and 110 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito, Baig and Derusco. Claim 13 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and WO 02/098646. Claims 21-23 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and Sethuraman. Claims 24-26 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and Savoly. Claims 30-32 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and Derusco. Claim 35 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and Applicants' allegedly admitted prior art (i.e., ¶24). Claim 36 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito, Applicants' allegedly admitted prior art (i.e., ¶24) and EP 1088632. Claim 37 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito, Applicants' allegedly admitted prior art (i.e., ¶24) and Derusco. Claims 41-42 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito and White. Claims 43-44 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Saito, White, and McLarty.

Claims 45-46 stand rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon and Delcoigne. Claim 47 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Delcoigne, and McLarty. Claim 48 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Delcoigne, Baig, Sethuraman and Derusco. Claim 49 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Delcoigne, Baig and Derusco. Claim 50 stands rejected under 35 U.S.C. § 103(a) as obvious over the combination of Weldon, Delcoigne, and Applicant's allegedly admitted prior art (i.e., ¶36).

The Obviousness Rejections of Claims 1-44 and 96-122

The obviousness rejections are respectfully traversed.

A. Weldon et al.

The Office Action acknowledges that Weldon et al. fails to disclose a panel having the particular sound absorption properties recited in the pending claims, but asserts that it would be obvious to one of ordinary skill in the art to modify the continuous method for preparing gypsum wallboard taught by Weldon, through routine optimization, to arrive at the method of preparing acoustical panel recited in the pending claims.

By way of background, gypsum wallboard and acoustical panel are fundamentally different products, and accordingly, the requirements governing the manufacture of gypsum wallboard and the manufacture of acoustical panel are very different. The primary goal in acoustical panel manufacture is to prepare a panel that can meet certain acoustical requirements. Typically, acoustical panels prepared from set gypsum must have a signficant amount of void space in order to have sufficient acoustical properties. However, the presence of a large amount of void space causes these materials to be fragile. Accordingly, a major challenge in the manufacture of set gypsum acoustical panels is to introduce sufficient strength and durability without sacrificing the acoustical properties. Because of the challenges of manipulating a wet acoustical panel precursor having a large void volume during manufacture without having the panel precursor fall apart, acoustical panels typically are prepared as laminates where a second layer of material is placed on the panel to hold it together or from molds which hold the acoustical panel precursor together while the gypsum sets and dries. On the other hand, continuous methods of manufacture involve numerous transfers of wet precursor material across belts, rollers, and the like in order to transport the precursor from one manufacturing region to another. Such constant manipulation places considerable strain on the wet acoustical panel precursor and accordingly this method has not been used for the manufacture of acoustical panels because of their fragility.

Unlike acoustical panel manufacture, the primary goal in gypsum wallboard manufacture is to prepare a board having certain strength requirements. While wallboard manufacturers do introduce foam in an effort to make the wallboard more lightweight, such void space must be introduced in such a way that the strength properties of the board are not

compromised. Accordingly, gypsum wallboard products typically contain a small amount of void space consisting of very small, uniformly dispersed, closed cells. Weldon et al. exemplifies conventional methods of preparing gypsum board products which have good strength and nail pull resistance but are also lightweight. Weldon et al. teaches that conventional methods for the introduction of foam typically result in undesirably lower nail-pull values, but through control of the foam introduction, board products can be prepared having uniformly dispersed bubbles with small void sizes such that the board strength is not compromised. See, e.g., paragraphs [0058]-[0060] of Weldon et al. Thus, the board product taught by Weldon et al., like gypsum wallboard in general, comprises a large number of small, *closed* cells that are uniformly dispersed throughout the material.

However, the set gypsum wallboard materials taught by Weldon et al. do not have the particular sound absorption properties recited in the pending claims as discussed below. Moreover, one of ordinary skill in the art, following the disclosure of Weldon et al. could not arrive at a board material having the sound absorption properties recited in the pending claims. Indeed, Weldon et al. teaches away from the invention recited in the pending claims.

One of ordinary skill in the art will appreciate that significant acoustical properties generally only exist in set gypsum board products where there is a large amount of void space, for example large mechanically formed holes on the order of 1 cm diameter or more, see, e.g., instant specification at page 3, paragraph [0007], or where there is a relatively smaller amount of interconnected void space. See, e.g., instant specification at page 25, paragraph [0061]. The need for interconnected void space where the cells are of small diameter is also recognized by, for example, Saito et al., which describes a sound absorbing foamed gypsum molded article having an average cell diameter of "from about 0.15 mm to 4 mm" and having "many foam-cells, and the foam-cells are interconnected through fine passages." See Saito, col. 1, lines 10-35; Abstract; and Fig. 2. Similarly EP '632, which also discloses acoustical materials, teaches that "[a]lthough soap foam is added to lower the core density [of gypsum wallboard], the resulting structure may not have sufficient porosity to be considered acoustic." See EP '632 at col. 1, lines 43-45. EP '632 further teaches that "the foaming effect within the cement is important because it allows the creation of an open cell structure within the mixture to improve acoustic absorption performance of the cement." See, EP '632, col. 9, lines 27-30. In addition, EP '632 recognizes that "[t]here is a tradeoff between the acoustical performance and the durability. A highly porous, low-density

material may exhibit the best acoustical performance. Unfortunately, a low-density material tends to be fragile and difficult to handle and exhibits low durability, low scrubability, and low tensile strength." See EP '632 at col. 2, lines 38-44.

The argument presented in the Office Action appears to incorrectly assume that gypsum wallboard and acoustical panels are related by a continuum whereby as a wallboard product becomes more lightweight, it will inherently develop increasingly greater acoustical properties. However, such an assumption is patently incorrect. Even if a gypsum board product as taught by Weldon et al. and an acoustical panel theoretically contained the same volume of void space having the same average cell diameter, they would not necessarily have the same sound absorption properties. As discussed above, the configuration of void space (closed cell v. open cell) greatly affects whether a material will have good sound absorption properties, and whether a material will have good tensile strength and nail pull resistance. Generally a void space configuration which maximizes strength (e.g., closed cell), as taught by Weldon et al., minimizes sound absorption. Thus, one of ordinary skill in the art would not arrive at a more sound absorbent material following the teachings of Weldon et al., because any modification to increase sound absorption would result in a product which violated the requirement of good strength and nail pull resistance disclosed by Weldon et al. Indeed, Weldon et al. teaches away from the invention recited by the pending claims.

Even if one of ordinary skill in the art was motivated, based on the teachings of Weldon et al., to modify the continuous method described therein to make an acoustical material, such modification could not, and indeed was not by Applicants, achieved through "only routine skill in the art." As discussed above, low density materials that exhibit acoustical properties tend to be fragile and difficult to handle. This fragility is a significant factor when designing a continuous process since a continuous process requires the wet acoustical panel precursor to be manipulated constantly as the precursor is transferred across conveyors, rollers, and the like. As set forth in the Declaration of Mark H. Englert attached hereto, Applicants worked for several years to develop a continuous process for the manufacture of acoustical panels, as recited in the pending claims, which could produce an acoustical product having sufficient sound absorption properties to be considered "acoustic" but sufficient strength so as not to break apart during the manufacturing process.

B. Modification of Weldon et al. by Saito et al.

Regarding Saito et al. and its modification of Weldon et al., it is unclear to Applicants why Saito et al. was cited. Saito et al. is directed to the manufacture of sound absorbing, foamed gypsum articles having interconnected foam cells following the conventional, non-continuous method of casting gypsum slurry into molds. See, e.g., Example 1 of Saito et al. Nothing in Saito et al. teaches or suggests that the acoustical material can be prepared using a continuous manufacturing process as in gypsum board manufacture.

The Office Action notes that Saito et al. discloses the step of adding a foaming agent to a mixture of calcined gypsum, however, Weldon et al. also teaches this in the context of gypsum wallboard manufacture. See, e.g., Weldon et al., paragraph [0053]. Saito et al. is nothing more than an example of the conventional method of preparing acoustical panels used in the prior art.

C. Remaining Cited References

Nothing in Baig, Derusco et al., WO 02/098646, Sethuraman et al., Savoly et al., White, McLarty et al. and/or Delcoigne et al. cures the deficiencies of Weldon alone or in combination with Saito because none of these references discloses that gypsum wallboard described by those references can have sufficient void space and/or open cell configuration to give rise to acoustical properties as recited in the pending claims, without sacrificing the structural requirements (strength, nail pull resistance, etc.) required for wallboard. Accordingly, like Weldon, these references teach away from the invention recited in the pending claims.

EP '632 relates to a method for manufacturing acoustical panel, but, as discussed in Applicants' reply to the previous Office Action, EP '632 fails to teach or suggest a method comprising (i) forming a mixture comprising water and calcined gypsum and (ii) adding foaming agent to the aqueous calcined gypsum mixture. To the contrary, EP '632 discloses a process comprising the steps of (i) *dry* mixing the cementitious material and fibers, (ii) aqueous mixing water, surfactant and air to create foam and then (iii) combining and mixing the aqueous foam and *dry* cementitious mix to form a foamed cementitious material. See, e.g., col. 4, lines 17-23; col. 5, lines 46-60; col. 10, line 53 to col. 12, line 20.

The Obviousness Rejections of Claims 45-50

With respect to claims 45-50, the Office Action acknowledges that Weldon fails to disclose the formation of a second mixture or the related step of casting the second mixture onto a backing sheet to form a densified layer precursor, as recited in the pending claims, but asserts that such method would be obvious in view of Delcoigne et al. which discloses gypsum wallboard having multiple layers of different densities. The Office Action further acknowledges that neither Weldon et al. nor Delcoigne et al. teaches the manufacture of an acoustical panel having the sound absorption properties recited in the pending claims, but asserts (a) it would have been obvious to one of ordinary skill in the art to modify the methods for wallboard manufacture described by Weldon et al. as modified by Delcoigne et al. so as to arrive at an acoustical material as recited in pending claims 45-50 and (b) such modification would involve nothing more than "routine skill in the art."

The rejection of claims 45-50 is traversed for all the reasons discussed above. Weldon et al. discloses the manufacture of gypsum wallboard having good strength and nail pull resistance while being lightweight due to the presence of uniformly dispersed small closed cell voids. Accordingly, the gypsum board disclosed by Weldon et al. is not an acoustical material because it has insufficient acoustical properties, if any. Delcoigne et al. teaches the manufacture of plaster board having layers of differing density. While Delcoigne teaches that the density can be regulated by adding a "forming" (sic - foaming) agent, nothing in Delcoigne et al. teaches or suggests that the void space introduced into the less dense layers of the board would be sufficient in quantity or configuration (open cell v. closed cell) such that the plaster board will have *any* acoustical properties, let alone the sound absorption properties recited in the pending claims.

In view of the foregoing, the cited references, taken alone or in combination, fail to teach or suggest a method of manufacturing acoustical panels following a continuous process, as recited in the pending claims. Accordingly the obviousness rejections are improper and should be withdrawn.

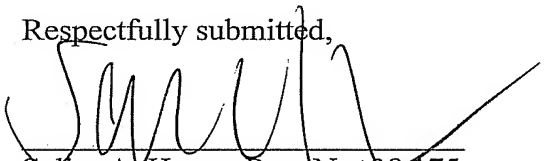
New Claims 123-163

Newly added claims 123-163 are patentable over the cited references for at least the reasons discussed above. Weldon et al. discloses a continuous method for making gypsum wallboard comprising primarily small uniformly dispersed closed cells and having certain strength and nail pull requirements. The wallboard material disclosed by Weldon et al. does not have acoustical properties as recited by the pending claims. Moreover, the emphasis by Weldon et al. for minimum strength properties of the wallboard would lead one in ordinary skill in the art away from the invention recited by the pending claims since modification of the gypsum wallboard so as to include an open cell structure sufficient to give rise to the acoustical properties recited by the pending claims would result in the manufacture of a material having strength and nail pull characteristics that were unsatisfactory for use in gypsum wallboard.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



Salim A. Hasan, Reg. No. 38,175
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, Illinois 60601-6731
(312) 616-5600 (telephone)
(312) 616-5700 (facsimile)

Date: October 5, 2007